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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/724,170	12/01/2003	Maureen Caudill	000479.00114	9385

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EXAMINER
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MYINT, DENNIS Y

ART UNIT	PAPER NUMBER
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2162

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/06/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/724,170	<b>Applicant(s)</b> CAUDILL ET AL.	
	<b>Examiner</b> Dennis Myint	<b>Art Unit</b> 2162	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on March 12, 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 81-98 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) 81-98 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. This communication is responsive to Applicant's Amendment, filed on March 12, 2007.
2. In the Amendment filed on March 12, 2007, claims 81, 87, and 93 were amended. Claims 81, 87, and 93 are independent claims. As such, claims 81-98 are pending in this case.
3. In light of the amendments made to claims 81, 87, and 93, rejection of claims 81-98 under 35 U.S.C. 101 is hereby withdrawn.

### ***Response to Arguments***

4. As per Applicant's argument regarding the objection of claims 81 and 87 (duplicate claims warning), said argument is persuasive and objection of claims 81 and 87 is hereby withdrawn.
5. As per the rest of the arguments, said arguments filed on March 12, 2007 have been fully considered but are moot in view of the new ground(s) of rejection.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 81-83, 86, 87-89, and 92 are rejected under 35 U.S.C. 103(a) as being unpatentable over of Maarek et al. (hereinafter "Maarek") ("Ephemeral Document Clustering for Web Applications", IBM Research Report, RJ 10186, April 2000) in view of Call (hereinafter "Call")(U.S. Patent Application Publication Number 2002/0143521).

As per claim 81, Maarek is directed to a method for vectorizing a set of document predicate structures (Maarek et al., Page 5, Paragraph 4) and teaches the limitations:

"identifying at least one predicate and argument in said set of document predicate structures (Maarek , Page 5, Paragraph 4)" ; "estimating conceptual nearness of two of said document predicate structures in said set of predicate structures" (Maarek, Page 7 Last Paragraph and Page First Paragraph, i.e. *Instead of the typical use of single words as indexing units, our indexing unit consists of a pair of words that are linked by a lexical affinity (LA)*). Maarek teaches a method for clustering using profile (word vectors) and document vectors wherein, "predicate structures" (Maarek et al., Page 5, Paragraph 4, i.e. *An indexing term can be a single term (possibly represented by a canonical form such as its morphological root, lemma or stem), or it may take more complex form such as phrases, syntactic constructs or lexical constructs.*) "are vectorized" (Maarek et al., Page 5, Paragraph 4, i.e., *For example, if the indexing units are single words, then each word represents an axis in a high-dimensional vector space, where the dimension is equal to the number of words in the collection.* and Page 7 Last Paragraph and Page First Paragraph, i.e. *Instead of the typical use of single words as indexing units, our indexing unit consists of a pair of words that are linked by a lexical affinity (LA) )* and

"outputting at least one document based upon the estimated conceptual nearness" (Maarek Page 7: Figure 1 An Example of dendogram; Page 18 Figure 5; and Page 19 Figure 6).

Maarek does not explicitly teach the limitations: "set of document predicate structures", "by a predicate key that is an integer representation" and "by subtracting corresponding ones of said predicate keys".

Call teaches the limitations:

*“set of document predicate structures” (Call, Paragraph 0117, i.e. Items may be organized into set which consist simply of an ordered collection of item numbers which are gathered in accordance with some criteria ....and The time in a set need not be of the same type, however, but may be collected in a single set based on the fact that they share some common attribute. Thus, times of type “apple” and of type “orange” may be collected together to form a set named “treefruit”).*

*“by a predicate key that is an integer representation” (Call, Paragraph 0070, i.e., a general purpose database program which stores natural language text and a rich variety of other typed data in an array of integers subdivided into data elements called items..)) and*

*“by subtracting corresponding ones of said predicate keys” (Note that, in the method of Call, data elements/concepts are identified by integers and data elements/concepts of similar attribute are organized into sets. Thus, it is inherent in Call’s method that conceptual nearness is obtained by subtracting corresponding one of predicate keys).*

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to add the feature of Call for storing data elements as sequences of integers with the method of Maarek for vectorizing phrases/pairs of concepts (words) so that the combined method would be a method for “vectorizing a set of document predicate structures, which comprises the steps of identifying at least one predicate and argument in said set of document predicate structures by a predicate key that is an

Art Unit: 2162

integer representation, and estimating conceptual nearness of two of said document predicate structures in said set of document predicate structures by subtracting corresponding one of said predicate keys." One would have been motivated to do so because computing machines could more efficiently manipulate *characters/symbols* when they are *represented by integers, Booleans, floating points, logical values, or the like* (Call, Paragraph 0009).

Referring to claim 82, Maarek in view of Call as applied to claim 81 above teaches the limitation:

"the method further comprising the further step of constructing multi-dimensional vectors using said integer representation" (Maarek et al., Page 5, Paragraph 4, i.e., *For example, if the indexing units are single words, then each word represents an axis in a high-dimensional vector space, where the dimension is equal to the number of words in the collection* and Page 7 Last Paragraph and Page First Paragraph, i.e. *Instead of the typical use of single words as indexing units, our indexing unit consists of a pair of words that are linked by a lexical affinity (LA).* ). Note that Maarek employs pairs of words and word vectors. Therefore, vectoring method of Maarek is multidimensional.

Referring to claim 83, Maarek in view of Call as applied to claim 81 above teaches the limitation:

“the method further comprising the further step of normalizing said multi-dimensional vectors” (Maarek et al., Page 5 Third Paragraph, i.e. .... *after normalization.*)

As per claim 86, Maarek teaches the limitation:

“wherein said set of document predicate structures are representations of logical relationships between words in a sentence” (Maarek, Page 7 Last Paragraph and Page First Paragraph, i.e. *Instead of the typical use of single words as indexing units, our indexing unit consists of a pair of words that are linked by a lexical affinity (LA).*)

Claim 92 is rejected on the same basis as claim 86.

Claims 87-89 are rejected on the same basis as claims 81-83 respectively.

9. Claim 84-85 and 90-91 rejected under 35 U.S.C. 103(a) as being unpatentable over Maarek in view of Call and further in view of Liddy et al. (hereinafter “Liddy”) (U.S. Patent Number 5873056).

As per claim 84, Maarek in view of Call as applied to claim 81 above does not explicitly disclose the limitation: “comprising further step of identifying at least one query predicate structure by a second predicate key that is a second integer representation, and constructing second multi-dimensional vectors, for said at least one query predicate structure, using said integer representation”.

Liddy teaches the limitation:



“comprising further step of identifying at least one query predicate structure by a second predicate key that is a second integer representation, and constructing second multi-dimensional vectors, for said at least one query predicate structure, using said integer representation” (Liddy et al., Column 5 Line 23-42). Liddy teaches a method for natural language processing with semantic vector representation, wherein queries are transformed into vectors to match document vectors (Liddy et al., Column 5 Line 23-42).

At the time the invention was made it would have been obvious to a person of ordinary skill in the art to add the feature of transforming queries into vectors as taught by Liddy et al. to the method of Maarek in view of Call so that, in the resultant method, query predicate structures will be included and the method would “further comprise the step of identifying at least one query predicate structure by a second predicate key that is a second integer representation, and constructing second multi-dimensional vectors, for said at least one query predicate structure, using said second integer representation.” One would have been motivated to do so in order to *enable retrieving of documents relevant to a query by matching a vector representing the query to the vectors representing documents*” (Liddy Column 1 Line 22-28).

Claim 85 is rejected on the same basis as claim 84.

Claims 90-91 are rejected on the same basis as claim 84-85 respectively.

10. Claim 93 and 95-98 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maarek in view of Call and further in view of Liddy and further in view of Dorocak.

Referring to claim 93, Maarek in view of Call and further in view of Liddy is directed to "the method of constructing multi-dimensional vector representations for each document of a set of documents" (Maarek) and teaches the limitations:

"determining each predicate structure of one or more predicate structures M in each document of the set of documents" (Liddy, Column 5 Line 31-33 *The lexical database which is used determines the SFC's*), "said M predicate structures include a predicate and at least one argument" (Maarek, Page 5, Paragraph 4, i.e. *An indexing term can be a single term (possibly represented by a canonical form such as its morphological root, lemma or stem), or it may take more complex form such as phrases, syntactic constructs or lexical constructs.*); and

"identifying the predicate and the at least one argument in each of said M predicate structures by a predicate key that is an integer representation" (Call, Paragraph 0070, i.e., *a general purpose database program which stores natural language text and a rich variety of other typed data in an array of integers subdivided into data elements called items.*);

However, the method of Maarek in view of Call and further in view of Liddy does not explicitly disclose the limitation "determining the fixed number of arguments q for vector construction".

On the other hand, Dorocak teaches the limitation:

"determining the fixed number of arguments q for vector construction" (Page 104 Line 38-45). Dorocak teaches a method the specification of context-sensitive properties for programming languages, *wherein the number of arguments are less than the*

Art Unit: 2162

*specified number of arguments, the unfilled argument positions are filled with zeroes (Dorocak, Page 104 Line 38-45, i.e. Where the number of arguments is less than the number of parameters specified in the corresponding definition, the argument list will be assumed to be filled out by arguments whose value is zero.).*

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to add the feature of filling the unfilled arguments with zeros as taught by Dorocak to the method of Maarek in view of Call and further in view of Liddy et al. so that the resultant method, "would further comprise

determining a fixed number of arguments  $q$  for vector construction" (Dorocak, Page 104, *specified in corresponding definition*);

"constructing an N-dimensional vector representation of each document based upon the predicate and  $q$  arguments" (Maarek et al., Page 5, Paragraph 4, i.e., *For example, if the indexing units are single words, then each word represents an axis in a high-dimensional vector space, where the dimension is equal to the number of words in the collection.* and Page 7 Last Paragraph and Page First Paragraph, i.e. *Instead of the typical use of single words as indexing units, our indexing unit consists of a pair of words that are linked by a lexical affinity (LA).),*

"wherein any predicate structure of said M predicate structures that includes less than  $q$  arguments fills unfilled argument positions with a numerical zero" (Dorocak, Page 104 Line 38-45, i.e. *Where the number of arguments is less than the number of parameters specified in the corresponding definition, the argument list will be assumed to be filled out by arguments whose value is zero.).*

One would have been motivated to do so in order to *provide a syntactic specification of the default attributes of a language by the description of modifications with are to be made the parsed form (syntactic tree) of instances of language.* (Dorocak, Page 101 Line 7-13).

As per claim 95, Maarek in view of Call and further in view of Liddy and further in view of Dorocak teaches the limitation:

“wherein conceptual nearness of two of said N-dimensional vector representation is estimated by subtracting corresponding ones of said predicate keys” ( “constructing multi-dimensional vectors using said integer representation” is taught by Maarek on Page 5, Paragraph 4 as *For example, if the indexing units are single words, then each word represents an axis in a high-dimensional vector space, where the dimension is equal to the number of words in the collection.*” and Page 7 Last Paragraph and Page First Paragraph, i.e. *Instead of the typical use of single words as indexing units, our indexing unit consists of a pair of words that are linked by a lexical affinity (LA).*) Note that, in the method of Call, data elements/concepts are identified by integers and data elements/concepts of similar attribute are organized into sets. Thus, it is inherent in Call’s method that conceptual nearness is obtained by subtracting corresponding one of predicate keys.

As per claim 96, Maarek teaches the limitation:

“the method further comprising the further step of normalizing said N-dimensional vector representations” (Maarek et al., Page 5 Third Paragraph, i.e. .... *after normalization.*)

Claims 97-98 are rejected on the same basis as claim 95-96 respectively.

11. Claim 94 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maarek in view of Call and further in view of Liddy and further in view of Dorocak and further in view of De Bellis (U.S. Patent Number 6760720).

As per claim 94, Maarek in view of Call and further Liddy and further in view of Dorocak does not explicitly teach the limitation: “wherein any predicate structure of said M predicate structures that includes more than q arguments omits remaining arguments after q argument positions are filled”.

On the other hand, De Bellis teaches the limitation:

“wherein any predicate structure of said M predicate structures that includes more than q arguments omits remaining arguments after q argument positions are filled” (De Bellis, Column 8 Lines, i.e., *When a parameter related to the search results is adequate **truncated**, the parameter is directed to the dispatcher 154;* and Column 14 Lines 18-23, i.e., *If the result list cannot be displayed at the terminal 14, **the truncator 152 decrements the parameter TP**.*

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to add the feature of truncating parameters as taught by De Bellis

Art Unit: 2162

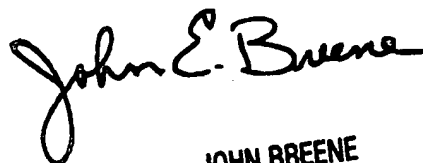
to the method of Maarek in view of Call, further in view of Liddy and further in view of Dorocak so that the resultant method would comprise parameter/argument truncation. One would have been motivated to do so in order to limit the number of arguments (parameters) to the acceptable number of arguments that an executing program/process could take, which is a notoriously well-known practice in the art of programming languages that excess arguments are truncated (omitted) when number of arguments to a routine is more than the predefined number of arguments of the routine.

**Contact Information**

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dennis Myint whose telephone number is (571) 272-5629. The examiner can normally be reached on 8:30 AM - 5:30 PM Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Breene can be reached on (571) 272-4107. The fax phone number for the organization where this application or proceeding is assigned is 571-273-5629. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Dennis Myint  
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